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Reinforced Concrete Combined with Light Steel Joists

Composite Floor Construction Well Adapted to Light Occupancy—Construction of Nurses' Home Proves Economy of Type—Erecting and Stripping Procedure

By ROBERT C. JOHNSON
Immel Construction Co., Fond du Lac, Wisconsin

THE Immel Construction Co., Fond du Lac, Wisconsin, has employed a type of floor construction during the erection of a 5-story nurses' home which is suggested as especially well suited to winter construction. It should be found adaptable to the needs of many structures contemplated under the PWA program, as well as private buildings and other structures, during the coming winter months.

Good Type for Light Occupancy

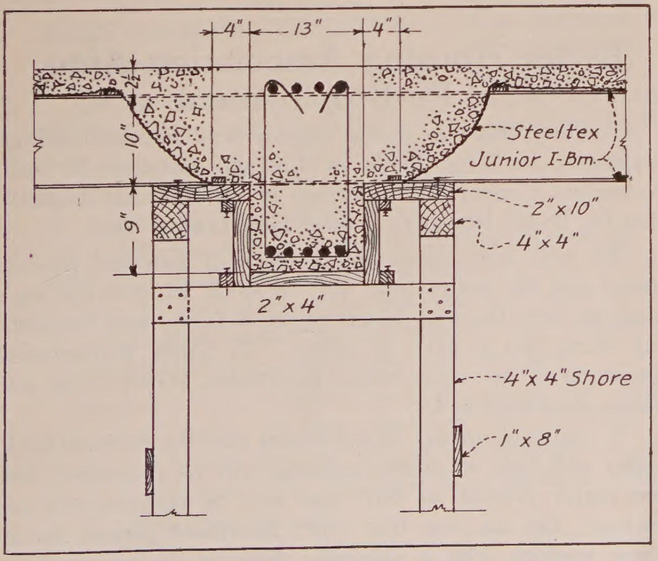
For some years there has been a growing tendency to use wall-bearing or steel skeleton construction in conjunction with steel joists for commercial and residential buildings subject to light occupancy loads. This type of construction has considerably reduced the amount of field labor employed by the general contractor for form and concrete work.

It has been the opinion of some construction engineers that a more economical system of structural framing could be developed by the use of concrete T-beams in conjunction with steel joists. In February, 1931, Schmidt, Garden & Erikson, a Chicago firm of architects, submitted five types of construction to contractors and found that for light live loads a junior I-Beam design with concrete T-beams was the most economical. Designs were later completed for the nurses' home mentioned, which is located at Fond du Lac, Wisconsin. The building is 182 by 57 ft., five stories high, with one row of beams and columns along each side of the central corridor.

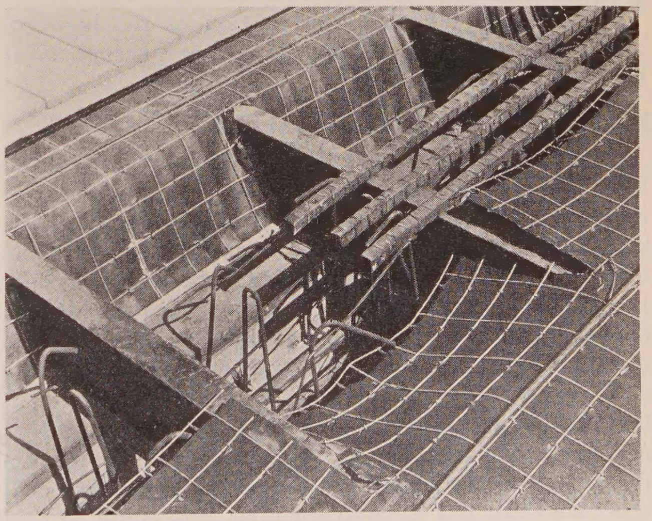
Erecting and Stripping Procedure

The field erection details were worked out by the Immel Construction Co., who acted as general contractors. The success of this type of construction depends entirely upon the forming and stripping details. The main reinforced concrete beams were formed in accordance with the line drawing, and as shown in the halftone illustration.

The procedure followed in the erection and stripping



Cross-section through main reinforced concrete T-beam



Showing junior beams extending across main reinforced concrete T-beams of the forms for the main beams was as follows:

Erection

1. Set up column reinforcing.
2. Set up column forms.
3. Set up beam forms.
4. Set up all shores.
5. Place stirrups and bottom reinforcing steel.
6. Place junior beams.
7. Brick up junior beams and nail on beam forms.
8. Place bridging and welding strip.
9. Stretch steeltex.
10. Cut steeltex at junior beams and bend down.
11. Nail down steeltex on tees.
12. Place top reinforcing steel.

Stripping

1. Strip columns.
2. Remove 2-in. by 4-in. support (after 24 hrs.).
3. Remove beam forms (after 24 hrs.).
4. Remove shores (after two weeks).

Procedure Explained

There are some peculiarities about the method followed in erection that require explanation.

1. The setting up of the column reinforcing steel before the building of form work is somewhat irregular, but this was done in this type of construction because there is no very rigid platform for working space from which to drop the built-up column reinforcing into the column boxes after the forms are erected. It was found to be more economical to set the column steel up first.

2. It was essential that the stirrups and bottom reinforcing steel be placed in all of the beams previous to the placing in the junior I-beams, as these beams ran across the reinforcing steel. In this design there are no bent bars in the beams, as these would interfere with the free passage of the junior I-beams.

3. The placing of a welding strip along the top of the junior I-beams near the edge of the concrete "T" is an essential detail to the satisfactory bending and placing of the steeltex.

4. It is absolutely necessary that the steeltex be stretched and held tight previous to the cutting along the tops of the junior I-beams. Otherwise there is great difficulty in lining the cuts up directly over the I-beams.

5. The reinforcing steel in the top of the beams is placed last, as this rests upon the junior I-beams and is held in position by them.

Providing for Re-Use of Forms

For successful stripping and re-using of one set of beam forms, it was necessary that there be no binding of the beam forms at the columns. To assure plenty of leeway for the stripping of these forms, all of the beam boxes were cut 1 in. shorter on each end than the distance between the column forms. This space was then filled in by the use of a composition board lightly tacked to the forms. By this method of construction there was plenty of leeway for the stripping of column forms ahead of the beam forms and there was no binding of beam forms against the column concrete. None of the column or beam forms had to be repaired for use on the upper floors. It was found that this composition filler strip could be used satisfactorily up to spans of 4 in. on the end of each beam. This was found to be much cheaper than the use of board fillers to extend the beam boxes, and in view of the fact that the columns and beams were all plastered the small ridge left in the concrete was not objectionable.

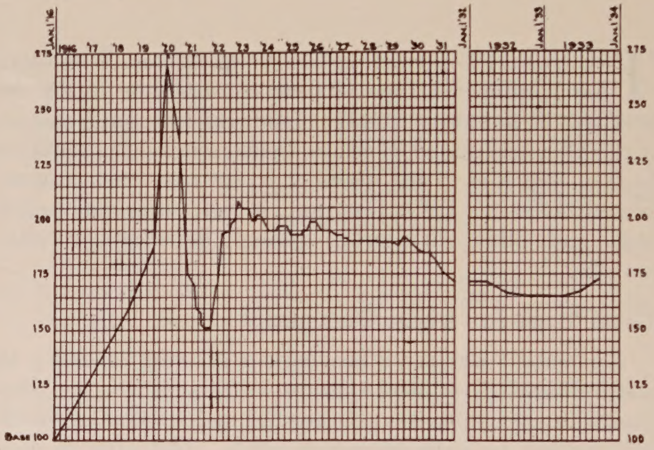
To tie the beams and columns together and make a rigid framework construction that would be self-supporting, the 2 by 10-in. "T" boards were notched at the columns and run past the column forms on each side. This was found to be sufficient bracing to tie the whole form work together.

In the writer's opinion, bar joists could be employed economically in the manner in which these junior I-beams were utilized in the work here described.

Aberthaw Index of Cost of Building

An upward jump of 5½ points brings the Aberthaw Index of cost of building construction to 173 for October 1, following an increase of 2½ points on July 1. The new index figure indicates a cost of $1.82 per sq. ft. of floor area for the 7-story reinforced concrete industrial building on which the estimate is based.

The advances in the two last quarters were due mainly to higher prices for construction materials, since direct labor rates on construction work have not as yet been affected by the NRA. It should be remembered, however, that the labor costs figured in the Aberthaw Index are the full union wage scale. In consequence, the chart does not reflect the much lower wage scales actually paid by many contractors in recent years.



Better Housing Association Aims at Re-Employment

A mighty effort to renew employment among building craftsmen is being made at Chicago October 31 and November 1 under the leadership of the National Association for Better Housing, at the Union League Club.

"We will have discussion leaders of national prominence and the entire time will be spent in securing suggestions from the best brains in the industry and correlating them into a plan of action," J. Soule Warterfield, chairman of the organization committee, stated in an advance announcement.

"A complete picture of the effects that the various NRA codes will have on home building will be presented, but the major portion of our time will be concentrated on finance. Let me urge that every interested person attend these sessions with a carefully thought out proposal to build a plan of unity."

Masonry Cements Must Be Pre-Mixed

California Earthquake Discloses Need for Control—Present Loose Practice Leaves All to Conscience of Mason Contractor —Recommendations of Davis Report to A. S. T. M.

THE earthquake which occurred in southern California at 5:55 p. m. on March 10, resulted in the loss of nearly a hundred lives, as well as injuries to more than a thousand persons, and caused property damage which some have estimated to be as great as $50,000,000.

The writer, who was in Los Angeles at the time of the quake, made on the following day a general inspection of the devastated area, including Long Beach, Compton, Huntington Park, Wilmington, and Lynwood, as well as the lower lying sections of the city of Los Angeles. Subsequently he spent four days in making a detailed investigation of buildings in the above-mentioned communities for the purpose of determining the behavior of public and business buildings in which unit masonry construction was employed.

Samples of masonry have been obtained from buildings which suffered damage or were destroyed, and other samples are in process of being obtained from nearby buildings of similar construction which withstood the earthquake without appreciable damage. These samples will be examined in the laboratory with regard to the character of the mortar and of the individual masonry units, as well as to the bond strength between mortar and masonry units. In this way, quantitative data will be obtained and valid comparisons will be made.

The need for using a reasonable amount of portland cement, or a cement having properties similar to portland, in mortars for masonry construction has never been demonstrated more emphatically than in the southern California earthquake which occurred on March 10 of this year.

A report prepared shortly after the earthquake, but published only recently, throws a flood of light on the subject and proves without question the necessity for a considerable proportion of cement in masonry mortars.

The report in question was prepared by Raymond E. Davis, chairman of Committee C-12 of the American Society for Testing Materials, and was addressed to the members of that committee. In his letter of transmittal he asserted that while the damaged buildings lacked the rigidity or unity of construction necessary to withstand earthquake forces, the greatest single factor contributing to this damage was, without doubt, the very inferior quality of the masonry mortars.

The accompanying report is condensed from the Davis report.—Editor.

Little Cementing Material in Mortars

Among the severely damaged buildings from which samples of mortar were taken, all of the mortars appeared to be deficient in cementing materials. They were porous and were so fragile that they could be crumbled with the fingers. In many instances where a wall had fallen, it was impossible to find any two bricks adhering to one another, and all the individual bricks with adhering mortar could be brushed clean with the hand.

In some of the collapsed buildings which had long, unsupported walls, all that remained was piles of loose brick and broken timbers. There was virtually no mortar bond in evidence. The dislodged joint material resembled sand rather than mortar.

A typical example was seen in the Polytechnic High School group, in Long Beach. This group consisted of 2-story buildings of brick or clay tile bearing-wall construction covered with stucco. The group as a whole suffered severely. In the main building, which collapsed completely, it was impossible to find two fallen bricks which still adhered to one another through the mortar joints. The quality of the workmanship in the masonry walls was poor, with little mortar between face and backing, and with other joints imperfectly filled. The destruction of this building may be attributed to inferior mortar, lack of unity in design, lack of bond or anchorage between its several elements, lack of cross-ties between walls, and poor workmanship.

Better Results with Better Mortar

The Practical Arts Building, also one of the Polytechnic High School group, tells a story distinctly different. This building had exterior bearing walls of hollow clay tile, the interior structural frame and corridor floors were of reinforced concrete, while the roof and classroom floors were of wood construction. Partitions were built of two thicknesses of 4-in. hollow clay tile. The principal damage to this building consisted of large diagonal cracks in the east and west end bearing walls and a partial failure of hollow clay tile partitions. A section of the east bearing wall fell. But in this building the masonry mortar was of considerably better quality than in the other buildings of this group; and where cracks occurred they were through the webs of the tile.

The primary difficulty with brick and tile construction lies in the mortar itself. A unit masonry wall is no stronger than the mortar in its joints.

Strengthening Building Code Requirements

While in most of our cities of any considerable size there are in operation building codes which in a measure specify the character and proportions of materials of which mortars shall be composed, in general, building codes are very loosely drawn. In practice, those portions which refer to mortars are largely inoperative. These codes should contain rigid specifications, not only as to the character and proportions of the materials of which mortar shall be composed, but also rigid specifications as to the strength and other properties of mortars after they have been applied to the masonry units and have hardened.

Small Buildings a Problem

On jobs of any considerable magnitude, building laws should make it mandatory that there be a masonry inspector constantly on the work. This would entail problems no different from those encountered in the inspection of other types of construction.

The real problem, however, is the small commercial building, where the employment of a full-time inspector would place a considerable burden upon the property owner. For this type of building, for which more than supervisory inspection would seem to be out of the question, two possibilities present themselves: (1) that all cementing and plasticizing materials should be delivered to the job in sacks already mixed in proper proportions to provide a masonry cement designed to meet certain definite specifications as to strength and other properties as defined by building laws, and (2) that the inspection shall include an actual examination of all masonry walls sufficiently intensive to demonstrate the quality of workmanship. This should include the actual removal of masonry units already placed, so that the character of bond between masonry courses and the degree of perfection with which the joints are filled may be determined. It might also properly include the actual taking of samples of partially hardened mortar from the joints, with later analyses of these samples to determine the amount of cementing material present in them.

Easy to Dodge Specifications

Masonry mortars must have cementing power, and the addition of plasticizing materials, which in themselves may add little to the strength, at least at the early ages, can have no benefit except in so far as they produce a mortar which works well under the trowel. It is recognized that the property of plasticity of a mortar is a practical necessity. It is the one in which the mason and the masonry contractor are ordinarily most interested, because plasticity is a property which makes it easy to assemble the masonry units and keeps the cost of construction low. For this reason, where two materials, one primarily a cementing agent and the other primarily a plasticizing agent, arrive on the job in separate containers, there is the constant temptation for the mason to reduce the proportion of cementing material and to increase the proportion of plasticizing material. It is a well-known fact that in many buildings where cement mortars have been specified, very little cement has actually been used. Building code regulations concerning the proportioning of mortar-making materials have been disregarded. To prevent this, it is suggested that masonry cements, themselves containing the necessary plasticizing materials, be specified for all masonry mortars, these cements to meet certain requirements as to strength and bonding power. Further, there should be attached a severe penalty for the use of materials other than sand and such cements in the preparation of masonry mortars, or for having on the job materials in the nature of cementing or plasticizing agents which will not meet the masonry-cement specifications.

It is believed that a plan such as this would react to the ultimate benefit of all concerned, since the desired plasticity of a mortar could not be secured without adding sufficient cementing material to give strength. There are, of course, at present a large number of masonry cements on the market; but the predominant practice is still to use a mixture of portland cement and hydrated lime, these arriving on the job separately in sacks. There would seem to be no good reason why the practice in this regard could not be discontinued without hardship to producers either of cement or of lime, since it is entirely feasible to combine these materials in any desired proportions at a central plant which may or may not be where the lime or the cement is manufactured. At the present time many masonry cements are being manufactured in this manner.

There should be no restrictions upon the methods of manufacture or character of the materials contained in the masonry cement provided it meets requirements so far as strength, plasticity, volume changes, etc., are concerned, and provided it contains no deleterious compounds.

Suggested Requirements for Masonry Cements

As a minimum requirement, standard mortar briquettes made of masonry cement and sand should have a tensile strength of not less than 150 lb. per sq. in. at the age of 7 days, and not less than 250 lb. in 28 days. Mortar cylinders of 2 by 4-in. size, mixed in the proportions of 1:3, with standard Ottawa sand, should have a compressive strength of not less than 1,000 lb. per sq. in. at the age of 7 days, and not less than 1,500 lb. in 28 days.

Sands for masonry mortars should be of such gradation that all particles will pass the No. 8 sieve, with not more than 30 per cent passing the No. 50 sieve, and not more than 3 per cent passing the No. 100 sieve.

Low-Cost Housing Conference Sponsored by Cleveland Society

The Cleveland Engineering Society, in co-operation with other interested organizations, was to conduct a National Conference on Low Cost Housing October 25-27. Sessions were to be held in the Builders' Exchange building, Cleveland.

An advance announcement stated that while the National Conference on Slum Clearance held in Cleveland last July dealt largely with the business factors of that problem, the housing conference of the Engineering Society was to give the engineers, architects, manufacturers and others interested an opportunity to exchange views on their related problems of a more technical nature.

The tentative program schedules a paper on "The Use of Cement and Concrete" by R. E. Copeland, of the cement association, another on "Specific Types of Low-Cost Housing" by Robt. W. McLaughlin of American Houses, Inc., and one on building code revisions, by Frank Burton, consulting engineer.

A. C. I. Selects Toronto for Thirtieth Convention

The thirtieth annual convention of the American Concrete Institute will meet at Toronto, Canada, February 20 to 22. Headquarters will be located at the Royal York Hotel.

This will be the Institute's first gathering to be held outside the United States.

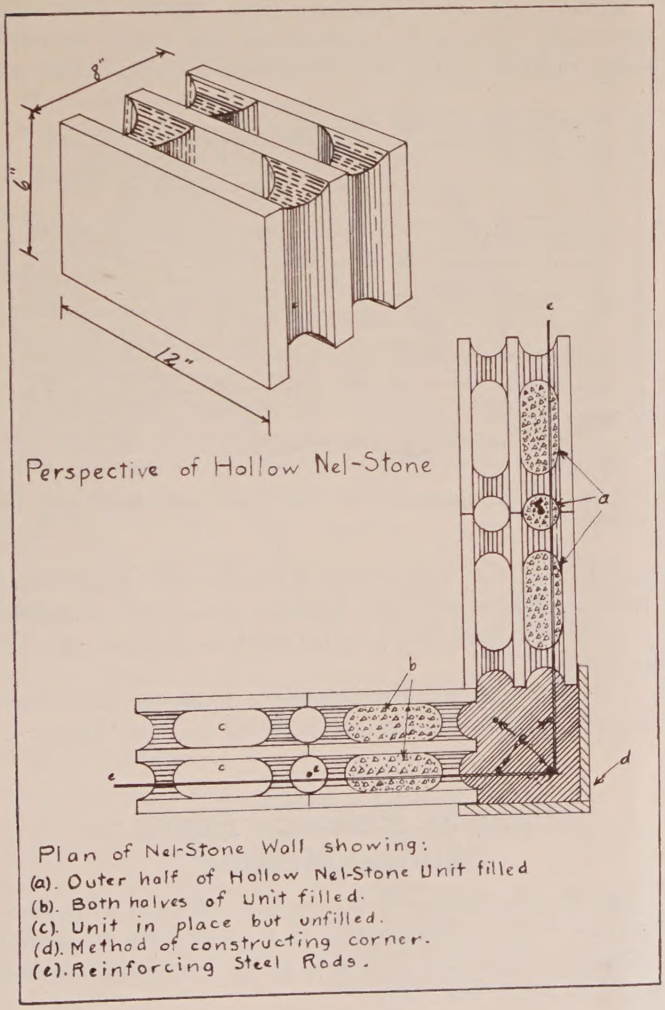
Wall Units and Reinforced Concrete Eliminate Need for Forms

Combination Produces Monolithic Wall—Precast Units, Set Without Mortar, Serve as Forms for Job-Placed Concrete—Construction Procedure

A COMBINATION wall of concrete building units and of concrete placed on the job, which produces, in effect, a reinforced concrete wall without forms, has been developed by the Nel-Stone Company of Texas, of San Antonio, Texas.

Manufacture of the Wall Units

This type of wall construction, known as the Nel-Stone system, involves, first, the manufacture of a special concrete unit, usually 12 in. square (but of smaller surface area, if necessary). These units are made in different thicknesses, depending on the wall thicknesses contemplated, but all of them are provided with semi-circular concave channels in each of the four contact sides, as shown in the line drawing. The units are cast in steel molds which are automatically vibrated, thereby eliminating porosity and obtaining concrete of high strength and a high degree of density.


8"
6"
12"
Perspective of Hollow Nel-Stone
e
a
b
c
c
e
d
Plan of Nel-Stone Wall showing:
(a). Outer half of Hollow Nel-Stone Unit filled
(b). Both halves of Unit filled.
(c). Unit in place but unfilled.
(d). Method of constructing corner.
(e). Reinforcing Steel Rods.

Detail of wall unit, showing how hollow spaces are reinforced with steel and filled with concrete

The initial curing of the wall units takes place in a steam-heated room, after which they are regularly sprinkled with water during a further curing period of 28 days. This process of curing insures completion of the shrinkage of the concrete which is coincident with the hardening process.

The procedure employed in the construction of these walls is well illustrated by one of the large residences built for Mrs. Amye Bozarth in the Olmos Park district of San Antonio.

The residence here illustrated is built without a basement, in accordance with the general practice in the South. For this reason it was necessary to carry the wall footings only to a depth sufficient to reach firm soil. The footing trench was dug 3 ft. wide and about 3 ft. deep all around the building. About 2 in. above the bottom of this level trench were then placed four ½-in. steel bars running longitudinally throughout the entire length of the trench and spaced about 8 in. apart. These parallel reinforcing bars were kept firmly in place by tying them to ⅜-in. steel cross-bars spaced 30 in. apart. The bottom of the trench was then filled with concrete, one foot in height. Dowel pins of ⅜-in. steel, spaced 12 in. apart were also set into the footing, on its center line, all around the building. The purpose of the dowels, of course, is to obtain a steel tie between the footing and the wall. This method, it will be seen, provided a continuous reinforced concrete footing 3 ft. wide and 1 ft. thick, under the exterior walls of the building, thereby insuring equal settlement if any settlement occurs.

Place Wall Units Without Mortar

The wall units were then set in place without mortar, one row at a time. After each row of units was placed, ⅜-in. steel rods were placed longitudinally in the semicircular channel formed by the upper surface of the units. The rods were lapped at the ends, so as to form continuous horizontal reinforcement all around the building, at vertical intervals of 12 in.

After three or four rows of the wall units were set, steel rods of ⅜-in. size were set into the vertical circular spaces between units. This 3-ft. or 4-ft. height of wall was then concreted, by filling (with a slushy, freely flowing mixture of concrete) all the horizontal and vertical cylindrical spaces formed by the concave grooves of the individual units.

It will thus be seen that this type of construction provides a wall that is reinforced both horizontally and vertically with steel rods spaced 12 in. apart. Because, in effect, the wall units themselves serve as forms for the job-placed concrete, no concrete form work is required on these walls.

Material and Labor

The Bozarth residence here illustrated has a wall surface of 4,850 sq. ft. above the footing. In consequence, the building required 4,850 wall units having a wall surface face of 12 in. by 12 in., and a thickness of 6 in. Wall reinforcement and footing tie rods required about 10,000 lin. ft. of ⅜-in. steel rods; and the footings, in addition, utilized about 800 lin. ft. of ½-in. steel reinforcing bars. This contract required 34 cu. yd. of job-placed concrete of a 1:3:4 mixture. Thus the 6-in. wall required about 7/10 of a cu. yd. of job-placed concrete for every 100 sq. ft. of wall area.

Bozarth residence, in San Antonio, under construction

The labor force employed on the Bozarth residence consisted of nine men, seven of whom were unskilled workmen and two were setters. The two setters, each with a helper, set an average of 750 to 800 sq. ft. of wall per day of 8 hours. The remaining five unskilled workmen followed behind the setters, placing the reinforcing steel and mixing and placing the concrete.

Bozarth residence, in San Antonio, completed with exterior finish of stucco

The exterior finish of the wall consists of portland cement stucco.

The walls of the residence here described are 6 in. thick. Walls of larger buildings require greater thickness, although the principles of construction are the same.

One of several buildings of larger size, recently built, is a 2-story and basement structure on Cevallos St., San Antonio, for the Southern Pecan Company. This building is 157 ft. long and 64 ft. wide, with a 9-ft. basement under the entire building.

The precast concrete units forming the basement walls were double-filled—that is, both the outer and the inner cylindrical hollow spaces were reinforced with steel and filled with concrete. From the ground floor upward, only the spaces in the exterior half of the units were reinforced and filled. The spaces in the inner half of the wall units, having been left hollow, form a ventilating or insulating space throughout the entire wall area.

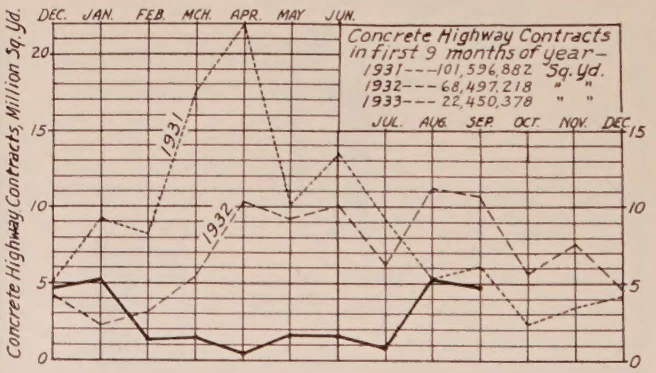
Acknowledgment

F. J. Gianotti is one of the owners of the Nel-Stone Company of Texas, and it is to him that CONCRETE is indebted for the information and photographs utilized in this description. The system of construction employed is covered by patents.

Concrete Highway Awards Continue in Moderate Volume

Concrete highway awards in September, according to figures collected and compiled by the Portland Cement Association, amounted to 4,825,889 sq. yd., dropping 474,000 sq. yd. below the August figures. Awards during the first two weeks in October amounted to 2,798,061 sq. yd. of concrete roads.

While from one standpoint these figures seem disappointing, it must be remembered that many contracts being awarded under the $400,000,000 federal highway fund are for the construction of bridges and grade separation structures and other highway structures. Expenditures of this kind are not expressed in yardage of concrete roads.



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Likewise, contracts for secondary roads of other than concrete construction are not included in these figures.

Highway Research Board in Annual Meeting

The Highway Research Board, with offices at 2101 Constitution Avenue, Washington, D. C., will hold its annual meeting on December 7 and 8 at the National Academy of Sciences, in that city.

Roy W. Crum is director of the Highway Research Board.

Build Mortar-Bound Macadam Roads with Bitumen-Coated Cement

Delayed Set and Slow Hardening Are Properties of Special Cements—Sandwich Type of Construction Described—Competes in Price with Bituminous Macadam

IT is, and has been, the aim of portland cement manufacturers to produce some rigid road surface at a price which could compete with bituminous macadam pavement for use in less traveled primary highways, where the highest type of concrete road construction is not warranted, as well as on secondary highways.

It has long been the endeavor of both the bituminous and portland cement manufacturers to get a proper combination of the two mixtures, for the purpose of bringing out in this combination the best qualities in each. The first people to succeed in developing this combination were the Germans, who, during the process of manufacture, have obtained the desired result by coating grains of standard specification portland cement with a thin coating of bituminous material, which imparts to the portland cement certain definite qualities which are decidedly contrary to our ordinary understanding of that material.

This material is known as a temperature-resisting cement, and in this country it is manufactured by the Medusa Portland Cement Company, although production will not be confined to any one portland cement manufacturer.

Well Adapted to Highway Construction

The material is particularly adapted for use in highway construction, but the expectation is that eventually it will be developed for structural purposes, especially where large mass construction is involved.

It is possible to lay on any solid highway sub-base a 4-in. road in accordance with the macadam principle, thereby providing a roadway for immediate use, having a non-skid surface and a minimum of cracks.

By the addition of bituminous material to the cement the initial set in this temperature-resisting cement is delayed for about 8 hours. It is, therefore, possible to continue the rolling operation from 12 to 15 hours after the material is laid, thus allowing ample time to shape the surface for riding quality. In addition, even though ordinary 28-day strength requires from 100 to 120 days to develop, the road is available for immediate traffic without injury to the material.

Working Procedure

Roads in this country have been constructed by placing on the sub-base a 2½-in. layer of irregular stones from 1¼ to 2¼ in. in size, followed by light rolling. Over this layer of stone a layer of 1:2½ mortar is spread, the mortar being, of course, composed of this bituminous treated cement, sand and water. A second 2½-in. layer of stone is then spread over the mortar, the stone sizes being similar to those in the bottom course. The entire mass is then rolled (with a 12 to 15-ton roller) until both courses are thoroughly penetrated and the mortar binder thoroughly compacted. The variation in the thickness of the mortar is dependent upon the voids in the stone, and the binder should be of such thickness that when the mass is thoroughly compacted no mortar should show over the top course of stone, it being preferable to have the mortar penetrate to within ⅛ or ¼ in. of the top of the road surface. If, however, due to uneven spreading, the mortar should show over the surface of the roadway, it should be thoroughly broomed until the face of the stone is exposed.

A grout coat is then broomed over the rolled surface, to fill all the voids between the faces of the stone. This leaves a thin seal coat over the stone itself. Chips or sand of ¼-in. size are thrown into this seal coat, and after the water has been repelled from the mortar the surface is again rolled with a 6 to 8-ton tandem roller for the purpose of embedding the chips or sand in the seal coat.

Seal Coat Worn Off

This seal coat, in a minimum of 8 to 14 days after traffic is turned on, will start to throw off, and, depending upon the amount of traffic, will in a few weeks be entirely thrown off, so that the finished surface of the road will have a mosaic appearance, similar to the open macadam surface. This seal coat is merely a temporary wearing coat to give the top stone a chance to be thoroughly set in the mortar binder before it actually takes wear.

Except for the use of a small transit mixer there is no equipment necessary other than that used for ordinary

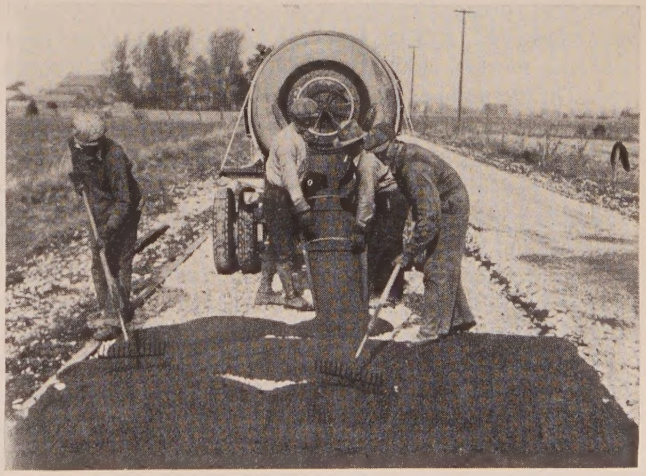

Figure 1. Spreading mortar of bitumen-treated cement and sand on lower course of stone, on Cedarburg, Wis., experimental project

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Condensed from paper by T. A. Pearson, of Fred T. Ley & Co., Inc., Springfield, Mass., at 30th Annual Convention of American Road Builders' Association.

macadam construction. Transit mixing is the best method of mixing and transporting the mortar material, since it allows the mixing process to continue for a long period.

The first experimental road in the United States in which this cement was used was laid at the York, Pa., plant of the Medusa Cement Company in November, 1931. Another road was laid at the Toledo plant six or seven months later. The first experimental stretch laid in locations other than those at the cement plants was installed in Great Barrington, Mass., where a strip 1,300 ft. long, 20 ft. wide and 4 in. thick was placed on a sub-base composed of 12 in. of thoroughly rolled slag. This work was placed under the direction of a German engineer, during the last week of September, 1932. In addition to this, another stretch approximately 1,000 ft. long was placed as a 2½-in. resurfacing layer over an old concrete road, without attempting to get any bond between the old and new. In the case of the 2½-in. resurfacing project the mortar layer was spread directly on the old concrete, rather than as a sandwich. A 3-in. layer of 1¾-in. stone was spread over the mortar, and after compaction the surface was sealed in the manner previously described.

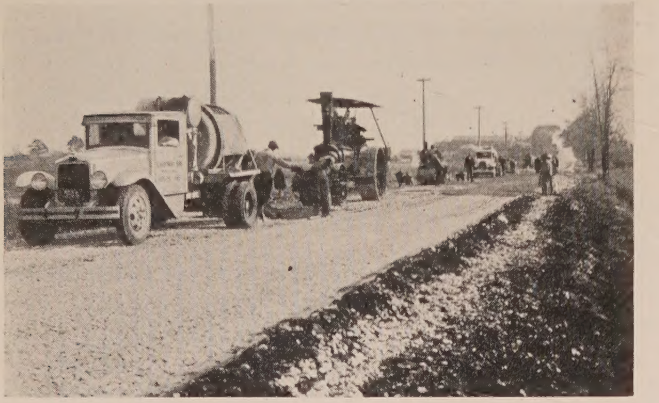

Figure 2. Construction equipment employed on project shown in Figure 1 includes transit mixers for delivery of mortar, a light roller and a heavy roller

The first week in October, 1932, a 2,000-ft. stretch of 20-ft. road 4 in. thick was started at Hampden, Mass. It was finished about the 15th of October. This piece was laid on an old gravel roadbed which had been scarified, reshaped and widened. No expansion joints were installed. All this work was done with welfare labor under the direction of the town superintendent of streets and the direct supervision of representatives of the cement company.

Other experimental roads placed during 1932, in which this bituminous treated cement was used, included a short stretch just outside of Providence, R. I., on the main highway between New York and Boston. This project was laid to build up a 4-lane concrete road slab on soft ground, which had settled by a maximum amount of 8 in. For the same reason a short stretch was placed at Oxford, Mass. These two projects were placed under the supervision of the state highway maintenance departments of Rhode Island and Massachusetts, respectively.

Other sections of road of this type were placed in Pennsylvania,[1] Ohio and Wisconsin, the highway department of the last-named state having built a road 1 1/3 miles in length.

All of the installations placed in 1932 have been observed by various state and federal highway engineers, who will doubtless continue to watch the performance of these roads under traffic conditions.

More Cracking Than in Germany

Although the use of the macadam principle of construction has permitted immediate use of these roads, cracks have developed to a somewhat greater extent than in roads built in Germany. In this connection, it should be recalled that the roads placed in 1932 are not provided with transverse joints.

The difference in crack development observed in American and German practice may be due to the different character of the portland cement employed. Ordinary portland cement meeting A. S. T. M. standard specifications was used in the American roads. The Germans, in contrast, use a portland cement that is ground coarser than American cements and is slow-setting. The slow-setting feature is an advantage, inasmuch as it gives the pavement ingredients more time to become adjusted under traffic. Chemical engineers have found the solution to this problem, so far as American cements are concerned.

Material Quantities Required

One of the most practical features of this type of road is its low cost. It can be laid at a price to compete with the average bituminous macadam road placed under federal and state specifications.

The quantities required for 100 sq. yd. of road having a finished thickness of 4 in. include—

12½ bbl. of bituminous treated cement.
4 cu. yd. of sand.
25 tons of crushed stone.

Acknowledgment

The bituminous treated cement employed in the construction of these roads, as previously stated, was manufactured by the Medusa Portland Cement Co., under a license granted by the T. R. C. Corporation.

New Jersey Products Men Form State Organization

The New Jersey State Concrete Products Association has been organized and is now functioning.

Horace W. Bush, vice-president of the Multiplex Concrete Co., Inc., Lyndhurst, N. J., has been elected president. Stuart Englis is secretary.

Coming Conventions

November 27-28—Mississippi Valley Association, annual convention. Statler Hotel, St. Louis.

December 7-8—Highway Research Board, annual meeting. National Academy of Sciences, Washington, D. C.

February 20 to 22—American Concrete Institute, thirtieth annual convention. Royal York Hotel, Toronto, Canada.

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[1] Described by U. J. Eckman in CONCRETE, November, 1932, page 8.

✦ EDITORIAL ✦

Are Contractors Prepared for Winter Construction?

A LARGE volume of PWA construction contracts will be awarded during the remaining months of this year, and all through the coming winter months. Privately financed construction projects will increase the total.

Once a contract is awarded, every form of pressure will be brought to bear upon contractors with the view of forcing an immediate start on actual construction.

No valid excuse can be given for failure to meet this demand for quick action. Most of the contracts will involve structures that can be inclosed or covered, such as sewage disposal plants, water works, bridges and grade separation projects.

With these prospects staring contractors in the face, each one should ask himself whether he is, or is not, prepared to carry on construction work in cold weather. He should know the condition of his construction equipment, and all worn-out equipment should be scrapped and replaced with new units. He should be able quickly to place his hands on tarpaulins, salamanders, boilers and other cold weather equipment.

Unless these very necessary preparations are made in advance, every contractor who is awarded a contract will waste several precious weeks while he is running around in circles, trying to round up construction tools and heavy equipment.

Construction work is not merely in prospect—it is an important part of the recovery program.

Every contractor should regard it as a public duty to see that he is equipped to expedite work on any and all contracts awarded to him.

Red Letter Day for Concrete Masonry

OCTOBER 5, 1933, was another red letter day in the history of the concrete masonry industry, for it marked the presentation of its code of fair competition at the public hearing held in Washington under the auspices of the NRA.

Many weeks were spent in the preparation of that code, by men who sacrificed their time and money and allowed their own business affairs to suffer, in order that a workable document might be presented.

These men were compelled by force of circumstances to work under pressure. Data had to be collected, then assembled and put into written form. Then followed discussion, rewriting, more discussion, study of the meaning of each clause and each sentence, and eventually the completed draft. In the meantime contacts were made with the various advisory boards of the NRA.

The code, in the form presented on October 5, represents the best thought of the industry, assembled from every section of the United States. It should help materially toward establishing the industry on a more solid footing. It should eliminate cutthroat competition. It eliminates selling below cost.

Final approval of the concrete masonry code will make it the law of the industry. It is a law with teeth in it; but it also presents opportunities to those who have the alertness to see them.

Now Then, the Cheaters

A ROAD contractor in a midwestern state recently completed a small project on which he was supposed to pay a minimum wage of 40 cents an hour.

According to his books he did pay 40 cents an hour; but in reality the pay envelopes always took account of deductions — purely imaginary — which brought the actual pay down to 17½ cents an hour.

For a little while, perhaps, contractors of this breed may be able to get away with these crooked practices.

But make no mistake about it—their time is coming. Clearly the next phase of the recovery program, following the adoption of codes of fair competition, is the adoption of means to enforce those codes.

Cheaters will learn that the National Recovery Act packs a stiff punch.

Mr. Hopkins Urges Diversion

VERY properly and very promptly, the advisory committee of the National Highway Users' Conference, acting through Chairman Alfred P. Sloan, has addressed a vigorous protest to President Roosevelt against the action of Harry L. Hopkins, administrator of the Emergency Relief Administration.

In a recent public statement attributed to Mr. Hopkins he is reported as having urged the diversion of state highway construction funds to public relief.

It is perhaps inevitable that a certain percentage of the key positions in the national administration will be occupied by men who lack knowledge of the subjects they are assigned to handle.

Apparently Mr. Hopkins does not know that highway construction is one of the best forms of relief, because approximately 90 per cent of the money expended is for payment of wages, either direct or indirect. Presumably he has not heard of the various court decisions against diversion of highway funds.

Perhaps through the action of the Sloan committee Mr. Hopkins is now better informed on this subject.

PROGRESS—In a Page

Current activities in research, in matters pertaining to concrete and cement, as being carried on or completed by various organized groups.

Highway Research Abstracts

HIGHWAY Research Abstracts No. 5, dated October, 1933, has been issued in multigraphed form by the Highway Research Board of the National Research Council.

These abstracts have been prepared for the most part from unpublished papers and reports which are believed to contain information of definite value to highway engineers. Among the papers abstracted in the present issue are the following:

(1) Effects of Thin, Flat or Elongated Particles in Coarse Aggregate, by George B. Sowers (Ohio).

(2) Effect of Hot Cement in Road Paving, by P. D. Miesenhelder (Indiana).

(3) High-Early-Strength Concrete, by E. W. Bauman (Tennessee).

(4) Study of Segregation of Coarse Aggregates and Use of Divided Coarse Aggregates for Its Prevention, taken from a report of the bureau of materials, division of highways, Illinois Department of Public Works and Buildings.

Copies of the current issue of Highway Research Abstracts may be obtained by addressing Roy W. Crum, Director, Highway Research Board, 2101 Constitution Avenue, Washington, D. C.

Building Research Station Publications

The Building Research Station, Watford, England, has in recent years issued a number of valuable technical bulletins and reports dealing with cement and concrete. Notable among them are the following titles, copies of which may be obtained from the British Library of Information, 270 Madison Ave., New York, at the net prices indicated:

Bulletins:

No. 2. Pozzolanas, by A. D. Cowper and F. L. Brady. Price 10 cents.

No. 5. Properties of Breeze and Clinker Aggregates and Methods of Testing Their Soundness, by F. M. Lea. Price 15 cents.

No. 7. Hot Cement, by N. Davey. Price 10 cents.

No. 9. Bonding New Concrete to Old, by N. Davey. Price 10 cents.

No. 14. The Reduction of Noise in Buildings; Recommendations to Architects, by Hope Bagenal and P. W. Barrett. Price 15 cents.

Special Reports:

No. 8. Fire-Resistant Construction, by R. E. Stradling and F. L. Brady. Price 45 cents.

No. 9. Lime and Lime Mortars, by A. D. Cowper. Price 50 cents.

No. 11. Heat Transmission, by Margaret W. Fishenden and A. F. Dufton. Price 20 cents.

No. 13. Effect of Temperature on the Setting Time of Cements, and on Strength of Cements, Mortars and Concretes, by W. N. Thomas and N. Davey. Price 30 cents.

No. 14 Use of Calcium Chloride as a Protection for Mortar or Concrete Against Frost, by W. N. Thomas. Price 20 cents.

No. 15. Corrosion of Steel by Breeze and Clinker Concretes, by F. L. Brady. Price 15 cents.

No. 16. Construction Joints in Concrete, by N. Davey. Price 55 cents.

No. 17. Estimation of Free Calcium Oxide and Hydroxide, by B. Bakewell and G. E. Bessey. Price 15 cents.

Technical Papers:

No. 3 Permeability of Portland Cement Concrete, by W. H. Glanville. Price 45 cents.

No. 6. Thermal Conductivities of Walls, Concretes and Plasters, by Ezer Griffiths. Price 20 cents.

No. 7. Investigations on Breeze and Clinker Aggregates, by F. M. Lea. Price 55 cents.

No. 9. Estimation of Free Calcium Hydroxide in Set Cements; a Calorimetric Method, by G. E. Bessey. Price 15 cents.

No. 10. Studies in Reinforced Concrete. I. Bond Resistance, by W. H. Glanville. Price 10 cents.

No. 11. Studies in Reinforced Concrete. II. Shrinkage Stresses, by W. H. Glanville. Price 10 cents.

No. 14. Influence of Temperature Upon the Strength Development of Concrete, by N. Davey. Price 20 cents.

Copies may also be obtained from H. M. Stationery Office, Adastral House, Kingsway, London W.C.2, England, the net prices in English currency being somewhat lower than the prices given above.

Structural Effects of Earthquake

A JOINT report by the city building inspection department of Long Beach, Calif., and the Structural Engineers' Association of Southern California is now in course of preparation, with the view of classifying the structural damage to buildings resulting from the earthquake of March 10, 1933.

Particular attention will be given to buildings having structural frames of reinforced concrete or of structural steel. In the form of charts the report will show the performance record of all buildings of these two types. It will describe the various filler walls, partitions and floor systems, and it will catalog the damage throughout the buildings by floors and elevations, as well as the percentage of damage.

It is expected that the report will be published by the Structural Engineers' Association of Southern California.

Road Publications Available

THE U. S. Bureau of Public Roads announces that the following publications, of interest to highway engineers, can be obtained at the prices indicated from the Superintendent of Documents, Government Printing Office, Washington, D. C.:

(1) Report of the Chief of the Bureau of Public Roads, 1932. Price 10 cents.

(2) No. 532D. The Expansion and Contraction of Concrete and Concrete Roads. Price 10 cents.

Code Hearings on Construction Branches Continue

Code hearings affecting several branches of the construction industry have been held in Washington, and others will be held in the course of the next few weeks.

Cement Industry. The cement manufacturers' code was given a hearing on September 15. The hearing was largely attended, and the question of dealer differentials was discussed at length. Dealers demanded the regular differential on all cement except that sold to the United States government, to state highway departments, and to railroads and public utilities.

Products manufacturers, on the contrary, vigorously objected to payment of a profit to the dealer, on cement which is shipped direct from the mill to the products plant and which the dealer never sees. The general contractor groups, likewise, objected to payment of a profit to the dealer where cement is shipped from the mill to the construction project, and where the dealer performs no service.

Finally two committees were appointed to work with the code commitee in an effort to harmonize the differences between dealers on the one hand, and contractor and products manufacturers on the other hand. No decision has been announced at this writing.

Concrete Products Industry. The hearing on the concrete masonry code was held on October 5, but no information is available as to when the code is likely to be approved. Announcement was made on October 3 concerning the appointment of Eugene F. Olson, of the Eugene F. Olsen Company, Adrian, Mich., as industrial advisor for the concrete masonry industry.

No serious objections were offered during the hearing on the concrete masonry code. Some suggestions made by the cinder unit group will require ironing out by the NRA, but these should not create any difficulty. It is noteworthy that, although more than a thousand codes had been submitted by October 5, the concrete masonry code was the 135th to reach the public hearing stage. This speaks well for the enterprise of the men having the code in charge.

Reinforcing Steel. October 23 was set as the date for the hearing on the code submitted by the reinforcing materials fabricating industry. This code is being sponsored by the Concrete Reinforcing Steel Institute, and the chairman of the code committee is William H. Pouch, of the Concrete Steel Co., New York City.

Engineers' Code. The professional engineers' division of the construction industry was given a hearing on the code submitted by that group, on October 10. As with others, no information is available as to the probable date of approval.

Ready-Mixed Concrete Association. The code submitted by the National Ready-Mixed Concrete Association, representing 65 per cent of the industry, was accorded a hearing on October 26, at the Willard Hotel, Washington.

May Borrow from NRA in Excess of Limitations

According to an opinion by O. T. Bundlie, assistant attorney general for Minnesota, governmental subdivisions of the state may borrow funds from the NRA and the RFC for highway construction and other public works construction, in excess of limitations on borrowing established by state laws, local ordinances or other requirements.

From the Patent Office

By J. KAPLAN
Patent Attorney, Washington, D. C.

Colored concrete product: John W. Ledeboer, Amber, Penna. U. S. Pat. 1,844,404.—The process consists of placing a thin deposit of coloring material on a belt, forming a slurry of cementing material and picking up a film from it. superimposing the film on the coloring deposit on the belt, assembling the combined materials as the surface layer of the freshly formed concrete unit, and pressing the surface layer into the concrete and allowing the unit to harden.

●

Concrete block with metallic face: Peter J. Maul, Detroit, Mich. U. S. Pat. 1,915,896, June 27, 1933.—The outer face of the concrete block is covered with a protective or ornamental coating of metal, anchored into the concrete.

●

Cementing oil wells: Lester E. Hodges and Oilfield Salvage Co., Houston, Tex. U. S. Pat. 1,914,548, June 13, 1933.—A cement plug may be formed at any selected location in a well bore. A barrier may be anchored at any point in the well, after which cement is dumped into the well casing and supported by the barrier until the cement sets and plugs up the pipe.

●

Imitating onyx or marble: Frank L. Hill, Orlando, Fla. U. S. Pat. 1,924,787, Aug. 29, 1933.—A vari-colored body coat is applied to the back of a plate of glass, to simulate the body of onyx or marble. Portions of this coating material are removed in a manner so that when material of different colors replaces the removed material, the effect produced resembles cracks, veins, or beauty spots.

●

Refractory mortar free from clay: Elizabeth Lux, Essen, Germany. U. S. Pat. 1,924,744, Aug. 29, 1933.—The composition comprises silica, an insoluble lime compound, and about 1 per cent of an organic binder containing both a starch capable of swelling in cold water and a dry residue from sulphite cellulose liquor.

●

Cement and gypsum mixture: Waldemar C. Hansen, Westfield, N. J. U. S. Pat. 1,923,370, Aug. 22, 1933.—The mixture contains from 20 to 50 per cent portland cement and 80 to 50 per cent calcined gypsum, and an inert filler. When used as the binding material in concrete the mass is quick setting, and the hardened concrete is strong and light in weight, and substantially insoluble as compared with set gypsum alone.

●

Concrete wall veneered with brick: Harry B. Olney and Charles M. Reed, East Chicago, Ind. U. S. Pat. 1,924,724, Aug. 29, 1933.—Concrete wall forms are held in place by metal ties having an extension on the outer end. This end extension of the metal tie is embedded in the mortar between brick courses, thereby holding the brick veneer in place.

●

Protecting concrete during curing: Elmer T. Anderson, Ontarioville, Ill. U. S. Pat. 1,841,928.—Evaporation of water is retarded by covering the surface of the newly laid concrete with multi-ply waterproof paper designed especially for the purpose.

●

Concrete slabs in wall construction: John William Thompson, Stanmore, New South Wales, Australia. U. S. Pat. 1,923,645, Aug. 22, 1933.—A double wall is built up between relatively thin and narrow precast concrete slabs. The slabs, when set up and held in place by tie rods, serve as forms for the concrete deposited between them. The tie rods then serve as wall reinforcement.

●

Watertight concrete: Walter Kirchner, Grunau-Berlin, Germany. U. S. Pat. 1,844,663.—This process of rendering mortar and concrete watertight consists of mixing the mortar or concrete with an aqueous solution of hydrates of alkali aluminates.

●

Pre-fabricated concrete building: Russell C. Olmsted, Cliffside, N. J. U. S. Pat. 1,924,801.—The building is made from large pre-fabricated reinforced concrete slabs, assembled and fastened together with bolts and angle irons. Window and door openings are formed in the pre-fabricated units. Dove-tailed nailing strips are embedded in the various units.

Less Shrinkage, Better Workability, with Prehydrated Mortar

Period of One to Four Hours Allowed for Hydration of Cement—Advantages Proved Through Actual Use—Hydrating Process Explained

By E. Y. BRAGGER
The Cement Marketing Company, London, England

IN the September (1930) issue of CONCRETE, pages 30 and 31, the writer published an article under the heading "Portland Cement for Masonry Mortars," in which he explained the procedure through which shrinkage may be eliminated where portland cement forms all or a considerable part of the cemening material in mortar. Prehydration for a period of 2 to 3 hours was urged as the solution of the problem, and a specification paragraph was suggested for the information and convenience of architects and engineers.

Since the publication of that article, additional experience has been gained in the use of prehydrated cement mortar, and more specification writers have learned of the possibilities of thus utilizing the good qualities of cement mortar while avoiding the undesirable habit of shrinking in its early setting stages.

Reduces Shrinkage, Increases Workability

In fact, the primary object of prehydrating cement mortar is that of decreasing shrinkage to the point where it is no longer a troublesome factor, and at the same time increasing the workability of the mortar. The commercial possibilities here presented are quite obvious, and are commended to the consideration of operators of central mortar mixing and ready-mixed concrete plants. Mortar containing portland cement in any desired or necessary proportions, scientifically prepared, and mixed to the proper consistency, may be delivered any time from 1 to 4 hours after the mixing water is added at the central plant.

Original Theory Proved in Practice

So long ago as 1912 the city engineer of a large city in New York State proved that there is more activity in mortar containing portland cement in the first 30 minutes than there is in the next 4½ hours. This was the writer's basis for his first thought on hydration. Why not allow the activity to take place in the mixing bed or by longer machine mixing rather than in place on the job? After minor experiments the method was first adopted for the stucco work on the writer's own residence on Narragansett Bay, R. I., in 1922. The work was watched with interest for five years. No cracks of any kind developed, and at this writing the stucco is in perfect condition.

These very satisfactory results prompted the writer to broadcast the information sparingly among a few reliable brick and stone masons, terrazzo and floor finishers, and plasterers, without a single disappointment to date. His first article on "Prehydration" was published in CONCRETE, as stated above. During the past five years many important jobs have been laid up with prehydrated mortar, including:

The Arlington Memorial Bridge, Washington, D. C., Granite Construction; Massachusetts Institute of Technology, Boston, Mass., Indiana Limestone; the Simon Building, Fitchburg, Mass., Brick Construction; Canadian National R. R. (3 Buildings), Halifax, N. S., Brick Construction; University of Toronto, Hygiene Bldg., Toronto, Ont., Brick Construction. .

The late Dr. Slater, Lehigh University, proved its value by showing increased strength and workability after mixing and hydrating beyond the 2½-hour period. Other scientific men have met with equally good results.

Action of Hydrating Process

Research men declare that only 40 per cent of the mixing water is needed to perfect crystallization of the cement during the hardening process. The remaining water must be taken up through absorption of the masonry units or given off through evaporation. Excessive water in the mix results in segregation, the fines sink below the pinnacles of the coarser aggregates, causing water to pass through the small valleys. The evaporation of excess water after the mortar is in place results in a shrinkage of the entire mix, particularly in the vertical joints.

During the process of hydration all of the necessary water is taken up and the greater part of the balance is given off through evaporation, flowability has been broken down and the workability increased due to a more complete action of the collodial properties. Any danger brought about by a segregation of the mix is entirely overcome resulting in a greater density, lower absorption, a minimum of shrinkage, and a consequent increased compression.

Mortar Usable for Long Periods

After a period of 2 to 4 hours of hydration (according to the atmospheric condition) it has been found necessary to use one glass (8 oz.) of water per cubic foot of mortar to bring the mortar back to the proper consistency. This has been done repeatedly without detrimental effect.

It is advisable and practicable that all lime and cement mortars and portland cement mortars gauged with lime putty or hydrated lime be mixed at a central mixing plant and delivered to the job for use within the 4-hour period. Increased workability has been noticed at the 6 to 8-hour period. Mortar containing ½ lime and ½ portland cement can be reclaimed the next day by mixing 1 part to 6 parts of the fresh mortar without any perceptible defects. It is advisable to keep such mortar covered to prevent surface drying.

Concrete technologists agree that longer mixing increases workability, density and strength, but students in engineering schools continue to be instructed to the effect that mortars containing portland cement must be used within 30 minutes after the water is added. Progress will eventually replace this teaching, as it has in many other instances.

By the use of prehydrated mortar the architect gains more satisfactory results. The contractor gains increased spread, increased workability, greater sticking qualities, easier pointing, less loss of material, and he avoids the inconvenience and costly operation of mixing at the job.

Construction Industry Awakens

From all available sources the evidence is unanimous in indicating an actual awakening and revival of the construction industry—or, more properly, the beginning of a revival.

F. W. Dodge Reports Favorable

A report issued by the F. W. Dodge Corporation on October 21 points out several significant features in the construction figures for September. For instance, the first evidence of improvement at the beginning of the second quarter of 1933 occurred in privately financed projects, in both residential and non-residential construction. The marked gain in construction in September was due mostly to the resumption of publicly financed construction, but privately financed projects continued to hold at the levels previously attained.

Still greater significance is seen by the Dodge organization in new construction projects contemplated. Since last March there has been a continued and rapid increase in new work planned, the September total of $846,726,700 being the largest since April, 1930.

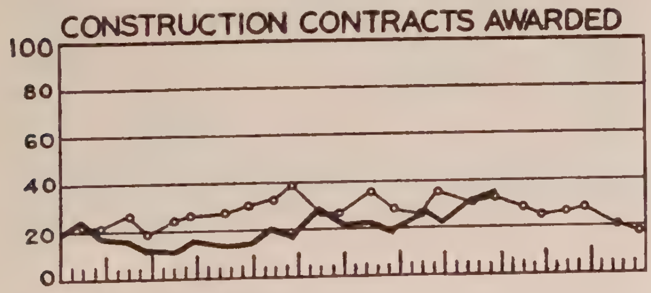

Figure 1. Construction contracts awarded, compared with 1923-1925 period. The heavy line is for 1933

The weekly supplement of the survey of current business, issued by U. S. Department of Commerce, tells a story similar to that of the Dodge organization. Figure 1 shows that the 1933 construction curve shoved up through the 1932 curve for the first time in September, and that improvement has been in evidence since the latter part of July.

Figure 2, taken from *Engineering News-Record*, is a graph showing weekly averages of contract awards on heavy engineering construction projects. The solid black columns are the weekly averages for the separate months. The hatched column shows similar data for 1932, and the unhatched columns are for 1931. Here, again, a marked increase is shown in September, and the gain has continued into October.

Considering the distinct character and duration of the advance, and the further fact that the PWA has begun to function, the beginning of a definite revival in constructions appears to be at hand.

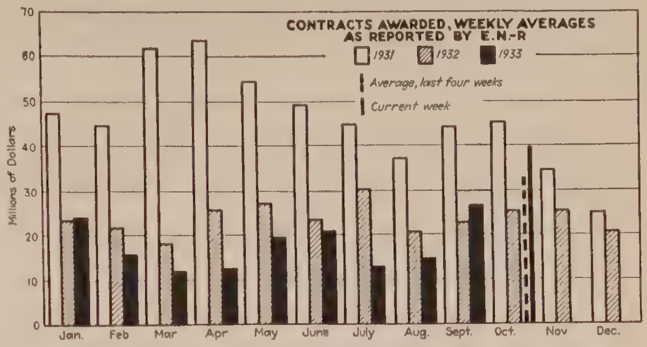

Figure 2. ***Engineering News-Record*** **chart showing weekly average contracts awarded for heavy engineering construction projects**

Fireproof House Construction Favored by PWA

Under a ruling of the special board for public works, covering low-cost housing projects financed by the PWA, fireproof house construction will be given distinct encouragement because of the long amortization period allowed for this type.

In cases where slums must be destroyed to make room for the new housing development, the amortization period will be 35 years, thereby permitting the loan to be amortized in 33 annual payments, beginning two years after the loan is made.

For other fireproof low-cost housing developments the amortization period will be 30 years, requiring 28 annual payments beginning two years after the loan is granted.

Housing projects utilizing ordinary masonry walls with wooden interior construction will be allowed an amortization period of only 25 years, requiring 24 annual payments starting one year after the loan is made.

Architects and Engineers Find Legal Counsel a Detriment

The U. S. Treasury Department will look with much disfavor on those architects or engineers who retain legal counsel in Washington to aid them in obtaining professional contracts from the department. In fact, the department will be disposed to eliminate such architects and engineers from consideration altogether. This announcement was recently made by L. W. Robert, Assistant Secretary of the Treasury.

Early in the summer the Treasury Department learned that certain Washington lawyers had been soliciting engineers, architects, and others, interested in obtaining government business, representing that to retain such counsel would enhance the opportunities to obtain desirable contracts.

Representation of the nature lawyers would provide could not possibly have any bearing upon the selections made by the Treasury Department.

Design of Circular Tanks

BY E. COWAN
NEW YORK, N. Y.

THE alignment chart here illustrated was devised to facilitate computations for reinforcing steel in circular concrete bins for grain storage. The chart solves the well-known Janssen formula usually given in engineering textbooks on grain bin design. Similar diagrams can be constructed for other materials by changing the constants.

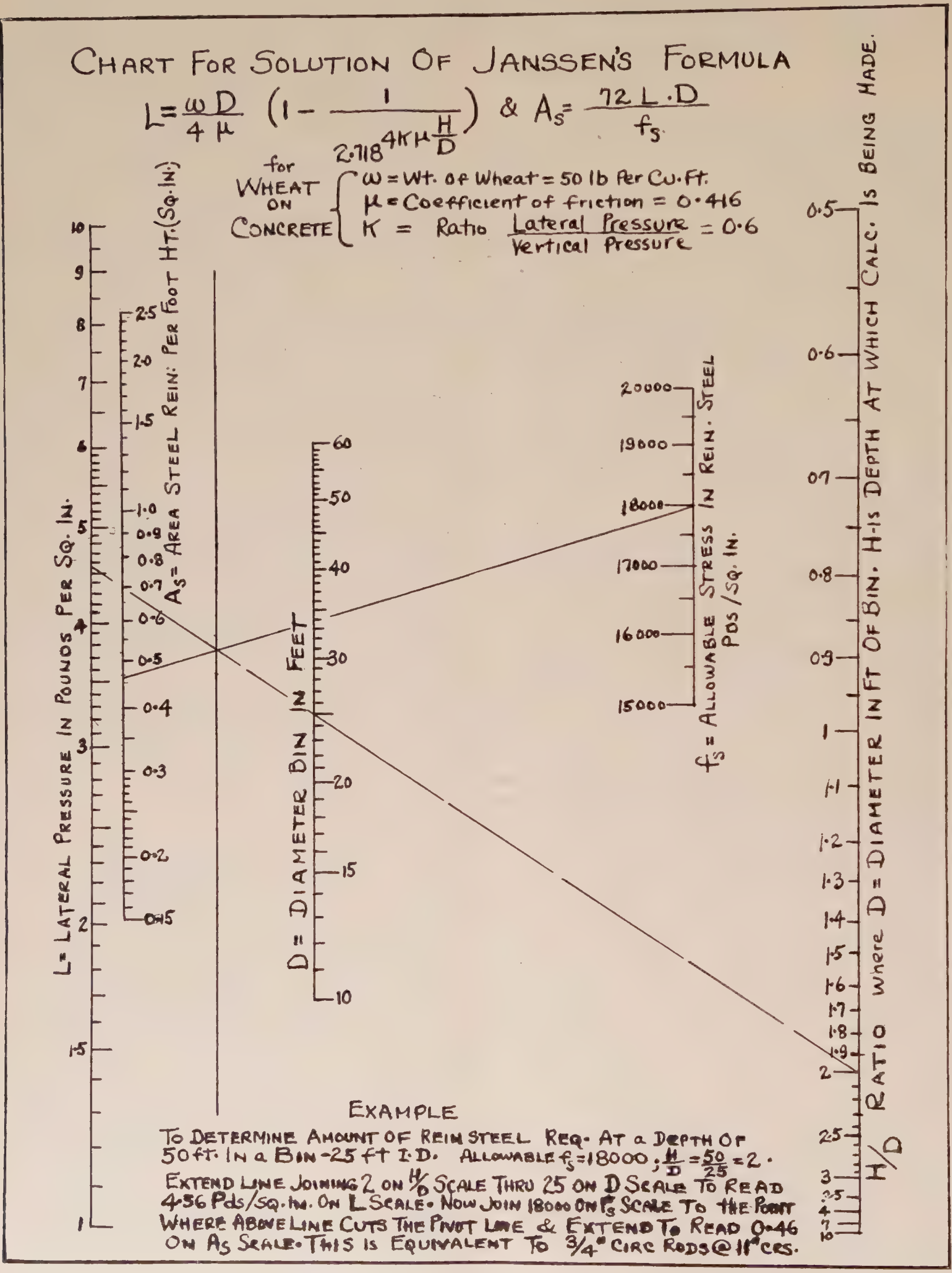

CHART FOR SOLUTION OF JANSSEN'S FORMULA

$$L = \frac{\omega D}{4\mu}\left(1 - \frac{1}{2{\cdot}718^{4K\mu\frac{H}{D}}}\right) \quad \& \quad A_s = \frac{72\,L\cdot D}{f_s}$$

for WHEAT ON CONCRETE
ω = Wt. of Wheat = 50 lb Per Cu. Ft.
μ = Coefficient of friction = 0·416
K = Ratio $\frac{\text{Lateral Pressure}}{\text{Vertical Pressure}}$ = 0·6

EXAMPLE

TO DETERMINE AMOUNT OF REIN STEEL REQ. AT a DEPTH OF 50 ft. IN a BIN-25 ft I.D. ALLOWABLE $f_s = 18000$; $\frac{H}{D} = \frac{50}{25} = 2$. EXTEND LINE JOINING 2 ON H/D SCALE THRU 25 ON D SCALE TO READ 4·56 Pds/SQ. IN. ON L SCALE. NOW JOIN 18000 ON f_s SCALE TO THE POINT WHERE ABOVE LINE CUTS THE PIVOT LINE & EXTEND TO READ 0·46 ON A_s SCALE. THIS IS EQUIVALENT TO 3/4" CIRC RODS @ 11" CRS.

L = LATERAL PRESSURE IN POUNDS PER SQ. IN.
10
9
8
7
6
5
4
3
2
1·5
1
As = AREA STEEL REIN: PER FOOT HT. (SQ. IN.)
2·5
2·0
1·5
1·0
0·9
0·8
0·7
0·6
0·5
0·4
0·3
0·2
0·15
D = DIAMETER BIN IN FEET
60
50
40
30
20
15
10
fs = ALLOWABLE STRESS IN REIN. STEEL POS/SQ. IN.
20000
19000
18000
17000
16000
15000
H/D RATIO where D = DIAMETER IN FT OF BIN. H - IS DEPTH AT WHICH CALC. IS BEING MADE.
0·5
0·6
0·7
0·8
0·9
1
1·1
1·2
1·3
1·4
1·5
1·6
1·7
1·8
1·9
2
2·5
3
3·5
4
7
10

Durable Concrete
Is Assured By Using
BARNSDALL ADMIX
Because it imparts

1. Flowability
2. Workability
3. Uniformity
4. Density
5. Watertightness
6. Greater Ultimate Strength
7. Resistance to disintegration by aggressive elements.
    (a) Physical resistance imparted by above properties.
    (b) Chemical resistance produced by combination of Barnsdall Admix (active silica) with the free lime in the cement to form additional cementitious matter which is insoluble. (The free lime in ordinary concrete is soluble.)

BARNSDALL ADMIX
A Pozzolanic Admixture (97½% Active Silica)
Produced by
BARNSDALL TRIPOLI COMPANY
Former Name American Tripoli Company, Inc. 1892
SUBSIDIARY OF BARNSDALL CORPORATION
Seneca, Mo., U. S. A.
Dealers and Stocks in Principal Cities

"Be Square" Products (Reg. U. S. Pat. Off.)

NOW---Share the Success of the Surface-Sepulcher

Surface-Sepulcher
TRADE-MARK
THE MODERN *EARTHLESS* GRAVE OF BEAUTY·PERMANENCE·PROTECTION

An Opportunity for Responsible Concrete Products Concerns to Establish Themselves in a New and Proven PROFITABLE Field!

Many desirable territories, which can be served direct from your present location, are still open to concrete products manufacturers wishing to become Surface-Sepulcher licensees. Many requests for options have already been received; many firms are now laying plans for the manufacture and sale of this line. There is still time for you to get the facts. . . .

If business has been so good with you these past few years that you have made an **ample** profit, and you have plenty of production work now, you'll not be interested in this. . . . But—if you have your nose "up wind" in search of something **new** and **profitable** to make and to sell, you had better call your steno, write for the details, and invest three cents in U. S. postage right away. What is required is a little skill in your trade, a small amount of capital—but not a fortune, the willingness to follow an already tested and established plan of manufacture and merchandising, and just plain horse sense! If you have these—write or wire at once. . . .

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HOW TO DO IT

✦ Questions and Answers ✦
Consultation and Comment

A department devoted to the solution of problems encountered in concrete work. Readers are welcome to add to or improve upon the suggestions printed and to submit their views for possible publication.

Repair of Seams in Block Silos

I have been asked to suggest a method of repairing seams which have developed in a concrete block type of silo.

Have you any suggestions to offer on the way in which this might be accomplished?—B. W. J., Burlington, Ky.

Your problem seems to be similar to cases where cracks develop in monolithic concrete tanks or silos.

The repair of cracks or seams in concrete tanks was discussed on this page in issues of CONCRETE dated May, 1932, page 33; June, 1932, page 33; and July, 1932, page 22. From the directions there given you should be able to determine the best method for making a successful repair job on the silo to which you refer.

Further information will be found in a report on the repair of masonry silos, mentioned on page 12 of the February (1933) issue of CONCRETE. That report was issued by the department of agricultural engineering of the University of Wisconsin, Madison, Wis., in November, 1932, as Stencil Circular 125, and under the title of "When the Silo Needs Repair."

The circular was issued in a limited number of copies, but our information is that copies will be available without charge as long as the supply lasts.

Materials for Garden Sculpture

Can you forward me the names of manufacturers or producers of cements and aggregates suitable for casting small concrete art objects such as garden sculpture?—G. S., Erie, Penna.

White portland cements, manufactured by several companies whose names are being forwarded to you, are frequently employed in cast concrete work of this type. Mineral colors, of the type advertised in CONCRETE, are used with the cement in obtaining various color effects.

Among the aggregates commonly used for this purpose, white silica sand, white limestone sand, and various colored aggregates, are employed in differing ways. A list of producers is being sent to you.

Most of these materials can be ordered through your local material dealers, or direct from the producers.

Design of Circular Concrete Tanks

Can you refer me to a book or to articles in CONCRETE *on the design of circular concrete bins for the storage of sand and gravel?—M. R. C., Cincinnati, Ohio.*

A very practical article on this subject, written by W. W. Hay, appears on pages 43 and 44 of the June (1928) issue of CONCRETE. It supplies the necessary design data pertaining to sand and gravel, including the constants to be used in the design formulas.

A useful book covering the design of circular concrete tanks for the storage of various materials will be found in W. S. Gray's "Reinforced Concrete Water Towers, Bunkers, Silos and Gantries," published in April, 1933, by Concrete Publications, Ltd., 20 Dartmouth St., London, S.W.1, England.

Placing Concrete Floors

We would be pleased to know where we can obtain authoritative information on what is considered the best practice in placing concrete floors. There seems to be considerable variation in the methods of different contractors.—F. O. S., Philadelphia, Penna.

The construction procedure recommended by the American Concrete Institute is given in slightly condensed form in three articles appearing in the May, June and August (1930) issues of CONCRETE. The full reports are printed in the 1930 *Proceedings* of the A. C. I.

Several valuable publications on this subject have recently been issued by the Portland Cement Association, from the general office at 33 W. Grand Ave., Chicago. One of these is entitled "Concrete Floor Finishes," first published in 1929 and recently revised. Another booklet recently issued by this organization is entitled "Working Specification for Bonded Concrete Floor Finish." Copies of the association's booklets may be obtained on request.

Movable Forms

Can you give me a reference to details of movable concrete forms, and the names of equipment manufacturers who make such forms?—A. K. W., Sioux City, Iowa.

Three useful articles on movable concrete forms and their operation appeared in CONCRETE in 1931, in the issues of April (pages 12-14), May (pages 33-36) and September (pages 11-12).

A list of companies equipped to fabricate such forms and the necessary accessories is being forwarded.

Colored Flagstone Sidewalks

I am a concrete contractor and a new subscriber to CONCRETE, *and I understand that some time ago you published a sketch and instructions on producing colored flagstone effects with concrete sidewalks. Please let me know in what issue that article appeared.—R. C. V., Orton, Minn.*

The article to which you refer was written by Douglas McKnight and appeared in the April (1932) issue of CONCRETE, pages 26 and 27.

BOOKS On Concrete

The books listed below have been carefully selected by our editorial staff as useful to those engaged in making concrete in all its various forms. Prices are cash in advance and include postage.

DESIGN AND CONSTRUCTION OF FORM WORK FOR CONCRETE STRUCTURES. By A. E. Wynn. 312 pages, 219 ills., 12 folded inserts and 11 design tables. Cloth bound, stamped title in gold. **Price $6.00**

"Wynn's Book" is a phrase commonly known to engineers, designers, and foremen, and is heard wherever concrete construction is under way. This book covers every phase of forms for concrete construction, and is fully and completely supplemented with many significant illustrations, tables and drawings and printed on a superior grade of enameled paper.

CONCRETE CONSTRUCTION MADE EASY. By Leslie Turner and Albert Lakeman. 113 pages, 65 illustrations, 16 tables. Cloth bound. **Price $2.00**

A practical book that solves problems in the design and erection of any type of concrete structure. Full designs with tables and all necessary information for building of foundations, walls, columns, floors, roofs, staircases, beams, water tanks, retaining walls, lintels, formwork, saw-tooth roofs, etc. A mine of information to the novice and a fruitful source of advice for the experienced. Written clearly and plainly.

MANUFACTURE AND USES OF CONCRETE PRODUCTS AND CAST STONE. By H. L. Childe. 354 pages. 265 illustrations. Color plates. Photographs. Completely rewritten and enlarged. **Price $3.00**

Deals with problems of how to: use dry mixes for architectural concrete; minimize crazing and efflorescence; design all kinds of molds; select materials; grade and proportion aggregates, regulate mixing, and govern curing; use color in concrete; manufacture columns, cornice posts, curb, blocks and slabs, brick, roofing tile, steps, sills, lintels and edgings, balustrades, sundials, bird-baths, lettered panels, ornamental work, etc. This new 1930 edition simplifies every phase of manufacture of concrete products and cast stone of every description for every purpose.

BASIC PRINCIPLES OF CONCRETE MAKING. By Franklin R. McMillan, Director of Research, Portland Cement Association.

The author has culled the essentials out of a mass of scientific data on this subject and presents them with force and directness in this book. He shows the effects of quality of material, of proportioning, mixing, working and curing on the finished concrete.

The importance of variable mixes; tests for permeability; how to obtain strength, durability and watertightness; effective ratios; importance of proper construction methods—these and many other vital topics are discussed fully and authoritatively.

The book represents not only extensive accumulated knowledge, but wide practical experience in the field and laboratory. It is an enlargement and revision of a series of notable articles on concrete mixing by Mr. McMillan published in 1929.

Ninety-nine pages, 6x9½, 32 illustrations and tables. Postpaid. **Price $2.00**

CONCRETE MONUMENTS, MAUSOLEUMS AND BURIAL VAULTS. By A. A. Houghton. 65 pages, illustrated. Paper bound. **Price $.75**

The molding of concrete monuments to imitate the most expensive cut stone is explained in this treatise, with working drawings of easily built molds. Cutting inscriptions and designs is also fully treated.

***MOLDS FOR CAST STONE AND CONCRETE.** By F. Burren and G. R. Gregory. Heavy board cover, 79 pages, 11 by 7½ in.; 44 full page illustrations. **Price $1.25**

Detailed working drawings for the practical mold maker, covering a wide range of concrete and cast stone products. Drawings supply the necessary information, and brief descriptions are given in each case.

A lot of good information, not only for cast stone manufacturers, but for makers of special products made of ordinary concrete, such as fence posts, chimney caps and pots, well linings, laundry tubs, etc.

***GENERAL ENGINEERING HANDBOOK.** By Charles Edward O'Rourke and 29 associates. Flexible cover; 921 pages, 5 by 8 in., numerous tables, diagrams and illustrations. **Price $4.00**

This book assembles a great amount of fundamental engineering data in usable form. 31 separate sections deal with as many specific branches of engineering.

Of particular interest to engineers who specialize in the use of concrete as a structural material are sections devoted to "Highway," by Thomas R. Agg; "Reinforced Concrete Structures," and "Stresses in Framed Structures," by Charles Edward O'Rourke; "Engineering Materials," by Herbert H. Scofield; "Foundations," by Roland P. Davis; and "Mechanics," by Alfred P. Poorman.

REINFORCED CONCRETE CONSTRUCTION. By George A. Hool, Professor of Structural Engineering, University of Wisconsin. University of Wisconsin Extension Series.

Vol. I—Fundamental Principles. Third Edition. 380 pages, 6x9, 139 illustrations, 18 tables, 28 diagrams **$3.50**

Vol. II—Retaining Walls and Buildings. Second Edition. 700 pages, 6x9, illustrated........ **$6.00**

Vol. III—Bridges and Culverts. 688 pages, 6x9, over 600 illustrations, 41 plates........ **$6.00**

***CONCRETE ENGINEERS MANUAL.** By Samuel Baker and A. DeGroot. Cloth, 401 pages, 5 by 7½ in., numerous drawings, charts and tables. **Price $3.00**

This volume is intended as a textbook for students of concrete engineering, and as a reference book for designers, foremen, inspectors, and others involved in the design of concrete structures and in the making and placing of concrete.

The book contains a complete description of the modern methods of proportioning concrete mixtures, mixing and placing concrete and steel, and providing waterproofing. Mathematical tables and the fundamental principles of mathematics and mechanics of materials, as applied to reinforced concrete designs, are included.

Among other subjects treated in individual chapters are form work, foundations, design of retaining walls, and estimating concrete work.

CEMENT CHEMISTRY IN THEORY AND PRACTICE. By Prof. Dr. Hans Kuhl, Director of the Institute for Cement Research, Berlin. Translated into English by J. W. Christelow, B.Sc. 64 pages, 6 by 9, cloth cover. Illustrated with a number of halftones and diagrams. **Price $2.50**

An authoritative book on the chemistry of cement, a translation of a series of lectures delivered by Dr. Kuhl in Moscow, at the special request of the Soviet government. The author presents the most up-to-date knowledge of the subject in simple language. The translator is one who knows his subject very thoroughly. The result is a concise record of modern research on the manufacture and setting of cement.

CONTENTS

1. The development of Cement Research.
2. The Theory of Cement Burning.
3. The Constitution of Portland Cement Clinker.
4. The Problem of Hardening and Its Significance in Cement Research.
5. The Chemistry of High-Strength Cements.
6. The Technical Aspect of High-Strength Cements.

PRE-CAST CONCRETE FACTORY OPERATION. By H. L. Childe, Editor, "Concrete Building and Concrete Products" (England). 190 pages, 5½x9, illustrations and layouts. **Price $2.00**

Complete descriptions of the plant layouts, equipment, methods, and processes of 20 English manufacturers, large and small. Includes the whole range of pre-cast units from the largest cast stone and roofing tile and plain block plants to the small producers of miscellaneous products.

SPECIAL COMBINATION OFFER To Regular Subscribers:

$1.50 (or $2.00 for Cement Mill Edition) added to the price of any of the above listed books will extend your present subscription one year from its present expiration date. Foreign and Canadian subscribers please write for details.

*Newly listed.

Book Department of CONCRETE, 400 West Madison Street, Chicago, Ill.

New Books and Pamphlets

Bridge Design

REINFORCED CONCRETE BRIDGE DESIGN, by C. S. Chettoe and Haddon C. Adams. Published by Chapman & Hall, London, 1933. Cloth binding, 400 pages, 6 by 9½ in. Halftones, line drawings, charts and tables. Price 42 s. net.

This book is written for the practicing bridge engineer as well as the student. An effort has been made to present bridge problems directly and simply. By means of tables and design charts much unnecessary work is saved, although the authors are careful not to carry these features to extremes. Room is left for the designer to make use of his own knowledge and imagination.

Because of the importance of the arch in bridge design, much space is given to this subject, the treatment covering the fixed arch, the two-hinged arch and the three-hinged arch. The appendix covers the derivation of formulas for the design of arches.

Booklets for Concrete Contractors

The Portland Cement Association, 33 W. Grand Ave., Chicago, lists a number of publications having special value as sales and promotion aids for concrete contractors. The list includes the following:

(1) Renovize with Concrete.
(2) Old Homes Made New.
(3) Steps, Porches and Terraces of Concrete.
(4) Walks and Drives of Concrete.
(5) Concrete Lily Pools.
(6) Concrete Storm Cellars.
(7) Yesterday's Basement Is Today's Recreation Room.
(8) Stop Those Destructive Termites.

Single copies of these booklets may be obtained on request. Larger quantities for use in sales and promotional work may be obtained at a nominal price, ranging from $1.10 to $1.75 per hundred.

Calcium Chloride for Curing Concrete Pavements

CURING OF CONCRETE PAVEMENTS WITH CALCIUM CHLORIDE, by H. F. Clemmer, is the title of a 6-page bulletin issued by the Calcium Chloride Association, 4200 Penobscot Building, Detroit, Mich.

The importance of proper curing, and latest facts and data on moisture supply, strength, volume change, surface condition and wear resistance, comprise the subject matter of this bulletin. The author bases his facts on his experience as engineer of materials for the District of Columbia.

Industrial Research Laboratories

BULLETIN OF THE NATIONAL RESEARCH COUNCIL is the title of a 223-page paper-covered publication issued by the National Research Council, 2101 Constitution Ave., Washington, D. C. Price $2.00.

This bulletin, compiled by C. J. West and Callie Hull, contains a list of 1,562 industrial research laboratories throughout the United States. A subject classification and the geographical distribution of the laboratories are also included.

ORGANIZATIONS

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS; W. C. Markham, Executive Secretary, 1222-24 National Press Building, Washington, D. C.

AMERICAN CONCRETE INSTITUTE; Harvey Whipple, Secretary, 7400 Second Blvd., Detroit, Mich. Thirtieth annual convention, February 20-22, Royal York Hotel, Toronto, Canada.

AMERICAN CONCRETE PIPE ASSOCIATION; M. W. Loving, Secretary, 33 West Grand Ave., Chicago.

AMERICAN ROAD BUILDERS' ASSOCIATION; Chas. Upham, Engineer-Director, National Press Building, Washington, D. C.

AMERICAN SOCIETY OF CIVIL ENGINEERS; Geo. T. Seabury, Secretary, 33 West Thirty-Ninth St., New York City.

AMERICAN SOCIETY FOR TESTING MATERIALS; C. L. Warwick, Secretary-Treasurer, 1315 Spruce St., Philadelphia, Pa.

ASSOCIATED GENERAL CONTRACTORS OF AMERICA; E. J. Harding, Managing Director, 222 Munsey Bldg., Washington, D. C.

BUILDING OFFICIALS CONFERENCE OF AMERICA; Wm. F. Hurd, Secretary, Room 203, City Hall, Indianapolis, Ind.

CAST STONE INSTITUTE; L. A. Falco, Secretary, Chapel St. and Blatchley Ave., New Haven, Conn.

CEMENT INSTITUTE; H. C. Lundborg, General Manager, 11 East 44th St., New York City.

CONCRETE MASONRY ASSOCIATION; Jack Franklin, Secretary, 7071 Plankinton Bldg., Milwaukee, Wis.

CONCRETE REINFORCING STEEL INSTITUTE; R. W. Johnson, Secretary, 333 North Michigan Ave., Chicago, Ill.

ENGINEERING INSTITUTE OF CANADA; 2050 Mansfield St., Montreal, Quebec.

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NATIONAL LIME ASSOCIATION; Norman G. Hough, Secretary and Manager, 927 Fifteenth St., N. W., Washington, D. C.

NATIONAL READY-MIXED CONCRETE ASSOCIATION; V. P. Ahearn, Secretary, 545 Munsey Bldg., Washington, D. C.

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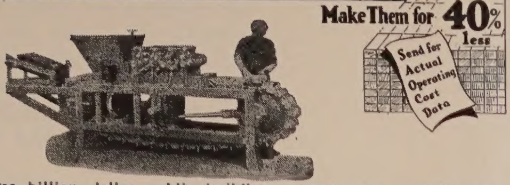
RAIL STEEL BAR ASSOCIATION; H. P. Bigler, Engineering Secretary; Builders' Bldg., 228 N. La Salle St., Chicago, Ill.

WIRE REINFORCEMENT INSTITUTE; R. D. Bradbury, Director, National Press Bldg., Washington, D. C.

WISCONSIN CONCRETE PRODUCTS MANUFACTURERS' ASSOCIATION, INC.; L. E. Schwalbe, Secretary, Wauwatosa, Wis.



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Statement of the Ownership, Management, Circulation, Etc., Required by the Act of Congress of August 24, 1912

Of Cement Mill Edition of CONCRETE, published monthly at Chicago, Illinois, for October 1, 1933.

State of Illinois, County of Cook, ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Louis Brookman, Jr., who, having been duly sworn according to law, deposes and says that he is the business manager of the Cement Mill Edition of CONCRETE, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Concrete Publishing Company, 400 West Madison St., Chicago; Editor, Norman M. Stineman, 400 West Madison St., Chicago; Managing Editor, Norman M. Stineman, 400 West Madison St., Chicago; Business Manager, Louis Brookman, Jr., 400 West Madison St., Chicago.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) Concrete Publishing Company, 400 West Madison St., Chicago; E. E. Haight, 400 West Madison St., Chicago; Louis Brookman, Jr., 400 West Madison St., Chicago; F. D. Porter, 139 North Clark St., Chicago; J. C. Langtry, 139 North Clark St., Chicago.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) R. Marshall, 6553 Woodward Avenue, Detoit, Michigan; R. W. Lesley, 611 Pennsylvania Building, Philadelphia, Penn.; Frances B. Whitton, 44 Philadelphia Ave. West, Detroit, Michigan; Gertrude B. Hartz, c/o Security Trust Co., 736 Griswold St., Detroit, Mich.; Helen Baker Taft, Box 381, Woods Hole, Mass.; Harvey Whipple, 641 New Center Bldg., Detroit, Michigan; F. F. Lincoln, 264 Lexington Avenue, New York City; Walter C. Boynton, 25870 East River Road, Grosse Isle, Mich.; D. F. Jennings, 607 Westminster, Detroit, Michigan; Porter-Bede-Langtry, 139 North Clark St., Chicago.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embacing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

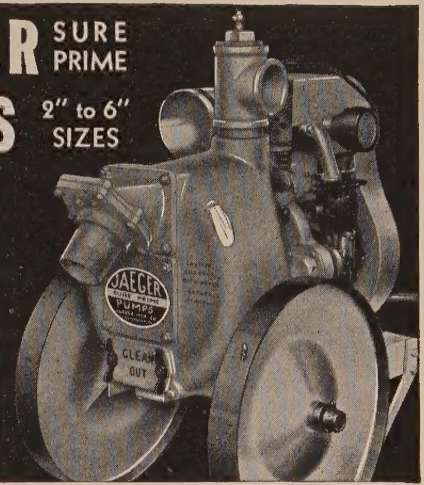
5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is: (This information is required from daily publications only.)

Louis Brookman, Jr., Business Manager.

Sworn to and subscribed before me this 28th day of September, 1933.

Jessie P. Bakke.

(Seal) (My commission expires May 26, 1934.)



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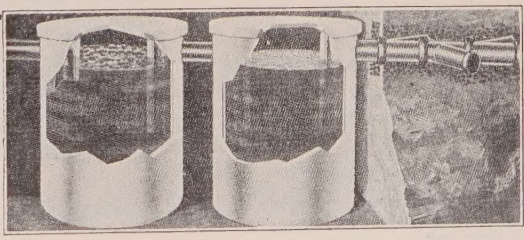

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Sell the idea of modernizing the home with a septic tank if your prospect is out of the block market. Our patented molds turn out a perfect product, they are easily erected and quickly stripped—York Septic Tanks are not expensive to manufacture and sell for a handsome profit.

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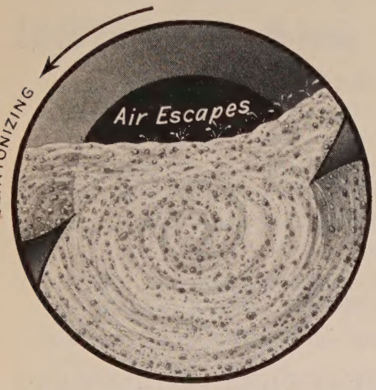
Internal, Helical Blades Improve Action of Concrete Truck

Effect of "Rolling Over" Is Aided By Newly Patented Addition—Segregation Further Lessened

A FUNDAMENTAL improvement in the Clinton process of hauling premixed concrete is announced by the Clinton Motors Corp., Reading, Pa.

The Clinton process for the prevention of segregation strengthens the concrete, it is claimed, because it allows air beaten in by the mixer to escape. It is said also to produce a mixture more homogenous and uniform in texture and to keep it plastic and workable.



Cross-section of tank in action

The equipment used, known as the Conveyor-Conditioner, is a cylindrical tank mounted on a truck chassis. The present improvement lies in two spiral blades of special cross-section. These are designed to aid the "rolling over" action of the contents.

As the tank slowly rotates during haulage, material engaged by the sloping faces of the blades is first raised to the surface, then slides off the inclined slope toward the center. A gentle but positive kneading action is thus produced and any material tending to settle is remixed.

There is no unnecessary agitation and no needless stiffening of the batch, notwithstanding the fact that segregation is prevented by the absence of "dead spots."

Since all parts of the contents are brought to the surface, air beaten in at the mixer has full opportunity to escape. Many tests are claimed to have shown that concrete thus processed is from 5 to 10 per cent stronger than when placed fresh from the mixer.

To discharge, the direction of rotation is simply reversed and the rear door opened. The spiral blades, acting now with their back surfaces, push the material rapidly out through the revolving opening. Reverse rotation is 50 per cent faster than hauling rotation, and the entire batch is quickly discharged. No hoisting is necessary.

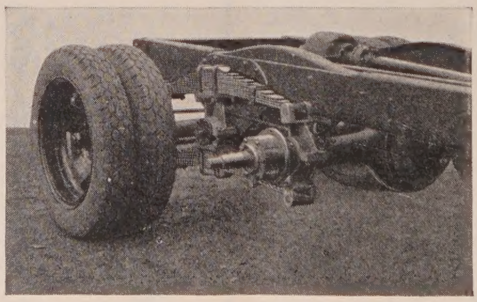
The height of the discharge spout may be from 50 to 68 in. above the ground.

EQUIPMENT and MATERIALS

Grico 2-Axle Drive Has Eight Forward Speeds

The Grico 2-axle drive is an auxiliary unit that may be incorporated with light trucks of any make, doubling their capacity. They are already in use, carrying all types of bodies—dump, stake, tank or semi-trailer, according to the Gear Grinding Machine Co., Detroit, Mich.

Features introduced by the use of these units are said to include eight forward speeds, reduction of the dead load to the minimum, longer tire life, extreme flexibility of driving axles, easy riding, and low investment costs.



Speeds are controlled from the cab, the driver selecting the proper gear ratio to procure the maximum effect of the motor under all conditions of roads and grades.

A diagrammatic illustration and other details are contained in a leaflet, A-13.

Perfection Air Cleaner Being Distributed

New models of many trucks, tractors and other power units will be equipped with the new and advanced Perfection type of air cleaner, developed by the Handy Governor Corp., Detroit. Deliveries of this device are already being made to Handy distributors and to a wide circle of manufacturers.

The Handy Perfection installs handily on any engine and has been designed to supply perpetually efficient air cleaning performance. It passes the incoming air through a dense fog of oil, which washes out all dirt. Service attention is reduced to the simple monthly operation of removing a reservoir and dumping the dirt. The initial supply of oil lasts indefinitely.

Industrial Literature

Vibro-Cast Catalog

The entire Vibro-Cast line of internal and external vibrators for concrete is cataloged in a new loose-leaf booklet issued by the *Electric Tamper & Equipment Co.*, Ludington, Mich. It is entitled *the Vibro-Cast Line for Concrete Placement* and is in readable, planographed form.

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Ace Joint Publication

The American Concrete Expansion Joint Co., Chicago, Ill., has issued a comprehensive new publication on *Ace* highway joints—"the heart of the highway."

An example of specification data for metal expansion and contraction joints is augmented by detailed drawings. The text gives particular emphasis to the advantageous design and the elimination of maintenance expense.

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Cords and Cables

A small leaflet devoted to Amerclad cords and cables is available from the *American Steel & Wire Co.*, Chicago. Specifications of seven types are included.

Amerclad cables are described as having high tensile strength and being free from kinks, very flexible and resistant to abrasion, oils and greases.

Manufacturers' News

Black & Decker Business

The Black & Decker Mfg. Co., Towson, Md., manufacturers of portable electric tools, since turning the corner in April of this year, report a consistent monthly increase in volume and earnings, although normally August is one of the dullest months of the year.

Employment has increased 127 per cent.